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ABSTRACT

Research about office computerization and its relationship to age, gender, and level in the organization is relatively new, despite increased use of computers in the offices and the belief that employee perception of the technology may be crucial to achieving technological effectiveness. A study was conducted to identify factors of a construct measuring attitudes toward technology and to examine the patterns of perception of various technologies to see whether each is perceived differently. Employees (N=82) of 10 organizations in two metropolitan areas of the United States chosen on the basis of technologies in use at different levels completed questionnaires on how the kinds of office technology they used affected their work. The results revealed that there were substantial differences in the respondents' perceptions of office technologies and various types of computers. The computer (personal computer, word processor, terminal), telephone, and typewriter were most frequently cited by respondents as their primary or secondary technology at work. The telephone was seen as helpful for communication, but also as a source of interruption. All three technologies were perceived as contributing to worker effectiveness. Moreover, the data revealed that the perceived effect of personal computers upon control and quality of work life was positive and that personal computers were perceived to have effects statistically different from word processors and main-frame terminals. These findings suggest implications for both researchers and practitioners. A four-page list of references and tables of data conclude the document. (NB)

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Attitudes toward Office Technology by Employees[1]

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Attitudes toward Office Technology by Employees

Abstract

Research about office computerization and its relationship to an employee's age, gender and level within an organization is relatively new, despite increased use of computers in the offices, and the belief that employee perception of the technology may be crucial to achieving technological effectiveness. On the basis of earlier findings, this study predicted that individual perceptions of technology would differ according to the type of technology used (typewriter, telephone or computers). The specific nature of the relationships were expected to be complex, depending on social background variables and type of technology. Further, respondents varied within the categories of computers they used most often (VDT's, word processors or personal computers). Moreover, the data revealed that the perceived effect of personal computers upon control and quality of work life is positive. Personal computers are also perceived to have effects statistically different from word processors and main-frame terminals. The results of this project and their implications for researchers, as well as practitioners, are discussed.

Attitudes toward Office Technology by Employees

The study of office technology and office automation is a relatively new area within the field of technological innovation. Much of the research in this burgeoning area concerns issues of implementation or enhancement of productivity (Bikson, 1981; Lieberman, Selig & Walsh, 1982; Stolz, 1982). The relative neglect of perceptions of users in the study of office information technology seems particularly pertinent to the so-called office revolution that is occurring in the 1980's (cf. Giuliano, 1982).

Technical concerns of innovation generally precede social considerations (Kahn, 1981). In other words, the employee's perceptions of, and reactions to, the technology are assessed only after it has been introduced. In the case of office automation, the equipment is usually installed before change-sensitive dimensions are defined and worker's reactions to them examined (Tydeman, Adler, Lipinski, Nyhan & Zwimpfer, 1982). Objective factors (the technology in a person's work environment) affect subjective factors (perception of work), which, in turn, influence the individual's responses (productivity and absenteeism) (Gattiker, 1984; Kahn, 1981; Katz & Kahn, 1978, pp. 577-609). As a result, computer use could increase an employee's enthusiasm, leading to lower absenteeism, or the opposite might occur.

This study was intended to identify factors of a construct measuring attitudes toward technology. We also examined responses of users of computer-based technology, telephone and typewriters to se if they differed in responses based on gender, hierarchical level of the respondent (managerial vs. non-managerial) and use of an intelligent work-station versus a main-frame terminal. These areas had been previously suggested by several researchers (Doswell, 1983, chap. 4 & 5; Gutek, 1983; Kling, 1978).

Research which compares several types of office technology is virtually non-existent. As the following review will show, organizational research has mostly concentrated on technology adaptation from the external, i.e., technical or corporate strategy perspective. Employees' beliefs and attitudes towards their jobs and towards their computers have not been taken into consideration by many researchers.

Office Technology and Work

Most of the organizational literature has concentrated upon the effect of technology on the work of the organization (Panko, 1984). Technological innovation requires the organization's adaptation to environmental changes to foster future growth (e.g., Gold, 1983; Kling, 1980). Of equal importance is addressing its effects on employees in order to achieve the desired productivity increases, which may, in part, justify the huge investments necessary for such technology (Gold, Rosegger & Boylan, 1980).

Technological changes in the office have significant effects upon the employee's skill level and job performance. As Spenner (1983) has noted, there is no clear agreement about the match between a job's skill requirements and the employee's skill levels. Some longitudinal studies have shown that any personal skills beyond those required will likely go to waste (Kohn, Schooler, Miller, Miller, Schoenbach & Schoenberg, 1983). Since any newly acquired technology usually fits the company's structure and design, changes in job skills and job design may not necessarily be the result (Gattiker, 1984; Bikson, Gutek, and Mankin, 1984; Pfeffer, 1982, chap. 9).

Some studies have examined the behavioral outcomes of technological changes in the office environment (e.g., Carter, 1984; Kling, 1980; Bikson, Gutek, and Mankin, 1984). However, the causal relationship between technological innovation and such behavioral outcomes as productivity, turnover and absenteeism has yet to be established (Dierkes & Von Thienen, 1984; Pfeffer, 1982, chap. 9). As a result, there have been claims that the

impact of technology upon individuals can hardly be measured with behavioral descriptions of jobs (cf. Cammann, 1981; Spenner, 1983).

Attitudes Toward Office Technology

Another helpful way of looking at the impact of a technology upon work may be a survey of the beliefs held by organizational members about this dimension. Their perceptions could influence their interpretations of events and their reactions to them (Bem, 1978; Weick, 1979). Differences in perceptions of technology may create or escalate conflicts and coordination problems, which, in turn, could affect productivity and profitability (Gold, Rosegger & Boylan, 1980). Individuals generally are not willing to change their attitudes, but if the technology is perceived as bringing welcome changes, it might encourage people to adjust their system of attitudes and beliefs (Larwood, 1984; Mobley, 1982, chap. 3).

In an examination of employee beliefs toward office technology, one of the primary areas would surely be its perceived impact upon work effectiveness. Organizations benefit if their employees see their new technology as an aid to increase such effectiveness. Management should also know how workers evaluate different types of technology (Gattiker, 1984). If people believe that their technology makes them more effective they will more easily accept it (Gattiker & Larwood, 1985). This is a prerequisite to achieving cost-efficient use of office technology (Dierkes & Von Thienen, 1984).

Another dimension concerns the quality of job life and the intrinsic enjoyment or tedium, as the case may be, of using a certain type of office technology. It is in the interest of both the organization and the worker to interpret the use of one's office technology as heightening the quality of job life. If fatigue becomes a factor, undesirable stress symptoms may occur (e.g. eye strain and back pain) (Kahn, 1981).

Control of employees by office technology must also be considered. Indeed, how much does a particular technology change the pattern of control and the working pace of office employees? (cf. Mankin, Bikson, Gutek, 1982; Working Women, 1980) For example, if computerization is perceived as affecting the accountability of individuals to their superiors, such beliefs may influence the quality of job life. However, very little empirical research has been done in this area (e.g., Kling & Iacono, 1984).

Still another factor to be considered is office technology and how it effects communication. Some technologies are more useful for this purpose than others and the computer may become a major new communication tool. Research has shown that people communicating via computers evaluated each other less favorably than did people communicating face-to-face (Kiesler, Zubrow, Moses & Geller, 1985). This is significant since a major part of office work involves the interchange of large amounts of data and information (Doswell, 1983; Panko, 1984). Employee perceptions of the impact of an office technology on work-related communications should be researched further (Dierkes & Von Thienen, 1984; Kahn, 1981). For example, people in a central typing pool may work more effectively because interruptions are few, but they might dislike the arrangement because it limits their opportunities for communication with colleagues in both formal and informal groups (Morgall, 1983).

Variation in Responses toward Type of Office Technology

Hierarchical level. Some researchers have argued that a person's level in the organization may determine the kind of use one makes of a given technology. Job structures at different levels will vary, which should, in turn, influence people's attitudes toward the equipment (Mankin, Gutek & Bikson, 1982). Unfortunately, there is very little applied research along hierarchical dimensions about people's attitudes toward computers. (eg., Panko, 1984).

Gender. Studies have shown that computerization may primarily affect positions usually held by women such as secretarial work (e.g., Gutek, 1983; Form & McMillen, 1983). Others have argued that computerization has "degraded" many women to the level of semi-skilled laborers who feel alienated from their computers and subsequently their work (Morgall, 1983). Again, investigations of this issue and relevant comparisons with men are seldom found (Working Women, 1980; Gutek & Bikson, 1985).

Type of technology. Office work involves several types of technology. Technological developments in equipment such as telephones and typewriters have been substantial over the last three decades (Lieberman, Selig & Walsh, 1983). More and more, however, computers have taken over many of the functions of the telephone and typewriter (Mey, 1981). Word processing programs produce correspondence with the help of computers (mainframe workstations and intelligent terminals), while telecommunication developments permit integration of telephones into computers (cf. Tydeman, Lipinski, Adler, Nyhan & Zwimpfer, 1982). Research in organizational settings comparing people's attitudes towards types of office technologies is limited, yet, such information is crucial when planning computerization of offices (e.g., Gattiker, 1984; Kahn, 1981).

Time spent with technology. It is reasonable to suggest that the amount of time spent with a technology during an employee's workday will influence his/her attitude toward it. Physical problems, such as eye strain or back pain, may be the result of long hours with computers (e.g., McGlothlin, 1984). New technical developments (e.g., better screens) have subdued much of the debate about physical problems. Some organizational researchers feel that the time spent with a certain technology will change people's patterns of technological attitudes (Ostberg, 1980), but this claim still needs to be tested in an applied setting.

Summary and Conclusion

It appears that there is only limited knowledge about how office technology influences employee beliefs and attitudes (Gattiker, 1984). Our understanding of these phenomena will be advanced by a comparison of different office technologies. Social background variables such as gender and organizational level might also help in explaining the patterns of perceptions of office technology.

Research Issues

This study was concerned with employees' perceptions of different types of office technology. Respondents were asked their impressions about their primary technology, that is, the equipment they used most. They were also asked about their support technology, represented by the equipment they used second most. Options included the telephone, computer (standalone word processor, CRT, or personal computer), typewriter (memory, electric, or manual), photocopy machine, or other types of office machinery.

The study was intended to:

1) identify an underlying factor structure for the perception of office technology.

2) examine the patterns of perception of various technologies to see whether each is in fact perceived differently.

This research was designed to take into account several other potential influences on perception of technology. One is the frequency of use of a technology which will affect the user. For instance, Bodmer (1982) claimed that occasional use of a CRT might lead to different perceptions than full-time use. Second, the respondents' level in the organization might affect their perception of the technologies used at work (cf. Mey, 1981). Another area of interest deals with possible gender effects upon the perception of technology. Some research has shown that women, who appear most adversely affected by technological change, are rarely dissatisfied with or hostile

toward their office equipment (Form & McMillen, 1983).

Method

Subjects

The subjects were 82 employees of organizations in two metropolitan areas of the United States. They included five Fortune 500 companies and five medium-sized firms. Each was chosen on the basis of the technologies already in use at different levels such as various types of computers (personal, word processor and VDT systems) as well as typewriters and telephones.

A random but proportional sample was chosen to include workers from all groups of office employees. Participants were sent a questionnaire which they returned directly to the researchers to ensure confidentiality. Respondents had an average of 7.1 years of work experience and an average tenure on the current job of 4.1 years.

Instrument

The short (10-20 min.) questionnaire was designed to assess "how the kinds of office technology you use affect your work." The first part identified the respondent's primary and support technologies and asked for an indication of how much each was used, while the last segment elicited background information. The largest section of the questionnaire was devoted to perceptions of the primary and support technologies. Respondents first evaluated their primary technology on 23 dimensions each measured on a five point scale anchored by "agree completely" and "disagree completely." They then repeated the same 23 questions evaluating their support technology.

These questions were designed to reflect concerns expressed in the literature about the impact of office technology on workers (e.g., Gattiker, 1984; Kahn, 1981). Their focus is limited since other important considerations such as effect of work skills also have an impact

(cf. Salzman & Mirvis, 1984). However, it is very difficult to measure people's attitudes toward possible skill changes (cf. Cammann, 1981). Moreover, some researchers claim that longitudinal studies are necessary to allow the discovery of such changes if they do in fact exist (e.g., Spenner, 1983).

Dependent Variables

The dependent variables were five factors extracted from the 23 items. Scores on the reduced factors were used in multivariate and univariate analyses of variance to determine any differences in employee perceptions of their primary and support technologies, with separate factor analyses conducted for each. The pattern of eigenvalues (Cattell, 1966; Kaiser, 1974) indicated that from three to five factors could be extracted from each data set of 23 items. After orthogonal varimax rotations, initial inspections of factor loadings revealed up to five interpretable factors from the two data sets. Loadings greater than .30 were statistically significant ($p < .01$), according to the Burt-Banks criterion (Child, 1970). Five scales were constructed by averaging scores from those items which loaded highly (greater than about .30) on each factor. Reliability analyses, as well as item-total and item-item correlations, were considered in making some deletions from, and additions to, the scales.

Results

Factors in the Perceptions of Office Technology

Of the original 23 items, 18 were retained to define the five factors. A description of the five factors and the items in each appears in Table 1. We labeled the factors as follows: (1) work effectiveness; (2) quality of work life; (3) control; (4) communication; and (5) interruption.

Insert Table 1 about here

As Table 1 shows, the five factors explain 66.9% of the total variance in this sample and work effectiveness explained the largest part (26.6%).

The two factors, communication and interruption, accounted for 8% and 7% respectively of the total variance explained, whereas quality of work life and control accounted for 14% and 11.3%.

Reliability of factors. Cronbach's coefficient alpha was calculated as an index of internal consistency for each of the five factors within each level of technology used. The reliability coefficients ranged from .69 to .92, except for the fifth factor in support technology where the reliability was .54. Consequently, most were well above .70 which has been suggested by Nunnally (1978, p. 245) as a desirable minimum for constructs in the early stages of formulation.

Gender differences. As shown in Table 2, men and women differed reliably in the types of office equipment they called their primary and support technologies. Men were more likely to make primary use of the telephone, while women used the computer or typewriter as their foremost technological tool. Computers (personal computer, word processor, and VDT) were mentioned more often as supporting tools for men than for women. These findings agree with other studies which show that office computer technology currently seems to affect women more than men (e.g., Bodmer, 1982; Gutek & Bikson, 1985; Working Women, 1980).

Insert Table 2 about here

Perceptions of the Impact of Specific Technologies

The three pieces of office equipment named most often were the telephone, computer and typewriter. Three groups of employees were defined for each according to which of these tools they used primarily and secondarily; persons who had designated other technologies were dropped from this analysis. Multivariate analysis of variance (MANOVA) and univariate analysis of variance (ANOVA) were used to compare the scores of each of the three groups on the five factors, with the results outlined in Table 3.

Insert Table 3 about here

The multivariate tests in both analyses (F tests of Pillai's V from SPSS MANOVA) showed highly reliable ($p<.001$) differences between the technology groups on the pattern of their scores on the five factors. Univariate tests using scores on the individual factors revealed strong group differences in both analyses for Factor 2 (quality of work life), Factor 4 (communication), and Factor 5 (interruption). Factor 1 (work effectiveness) showed significant group differences only for the supporting technology, and Factor 3 (control by equipment) did not show a significant group difference in either analysis (c.f. Table 3).

The patterns of group differences on the five factors were generally quite similar for primary and support technologies. Computers were reported to contribute most to enjoyment and stimulation on the job for both primary and secondary technologies, but they were seen as less helpful for communication than the telephone or typewriter. Typewriters and computers were perceived as less interruptive than phones. Predictably, the telephone was viewed as the greatest aid for communication, but it also scored highest on the "interruption" factor and lowest on "quality of work life." All three technologies were seen as very helpful for improving work effectiveness, although, in the supporting role, the telephone was somewhat lower than the other technologies.

Differences of Perceptions Across Office Technologies

Time spent with a technology during one's working day. It might reasonably be expected that perceptions of the role of a specific piece of equipment could be related to the amount of time one spends using it each day. To test this notion, all persons who reported using a computer as either their primary or secondary technology were placed into one of five groups according to the proportion of time they used a computer in their work. Analyses of variance were done to test whether scores on any of the five factors varied reliably as a function of usage time. Similar but separate analyses were conducted for persons who used a telephone or type-

writer as their primary or support technology.

Three of the fifteen tests (five factors on three technologies) yielded statistical significance. The strongest by far was for the control factor from individuals who spent considerable time on the telephone ($F(4,51) = 8.40$, $p < .0001$). People who used the telephone more than 75% of the day felt that it exerted much more control over them than did those who indicated less time with the telephone. Perceived contribution of the telephone to work effectiveness increased with the amount of time it was used ($F(4,51) = 2.58$, $p < .05$). Quality of work life was higher for primary typewriter users than for computer and telephone users.

Organizational level and perception of technology. One could also expect that perceptions about the impact of a specific piece of equipment might be related to an individual's level in the organizational hierarchy. Therefore, all persons who reported using a telephone as either their primary or secondary technology were placed into one of two groups according to position (managerial vs. non-managerial). Analyses of variance were used to test whether the scores of any of the five factors varied reliably as a function of level in the organization. Again, similar but separate analyses were conducted for persons who used a computer or typewriter as their primary or main support technology.

Only one of the fifteen tests (five factors on three technologies) reached statistical significance. Perceived contribution of the telephone to quality of work life was lower for managerial employees than for their non-managerial counterparts ($F(1,57) = 5.39$, $p < .05$).

Computer Technology in the Office

Type of computer technology and its perception. Perceptions of the role of office computers could very well differ according to type (Kling, 1980). For instance, some respondents in this sample used personal computers to do word processing as well as spreadsheet work, while others worked with word processors primarily to write reports, memos and

correspondence. Another group used VDT's, with the terminals linked to a main-frame system, mainly for obtaining information rather than running complex statistical packages.

All persons who reported working with either a personal computer, word processor or VDT as their primary or secondary technology were placed into three separate groups according to computer type. Analyses of variance were done to see if scores on any of the five factors varied reliably as a function of the type of computer used in the office.

Two of the five tests (five factors) in this study were statistically significant. The perceived contribution of the personal computer to quality of work life was notably higher than for VDT's or word processors ($F(2,75) = 2.97$, $p<.05$). Personal computer users also differed from the other two in regard to control ($F(2,79) = 3.8$, $p<.05$). VDT's were perceived as affecting control most negatively, followed by word processors. There was no difference according to computer types in how employees perceived the technology's impact upon communication, interruption or work effectivness.

Gender and perception of computer-based office technology. Much has been written about the fact that computerization in offices affects women more than men (Form & McMillan, 1983; Gutek & Bikson, 1985; Morgall, 1983). To test this, all persons who reported using a personal computer, as either their primary or secondary technology, were placed into one of two groups according to sex. Analyses of variance were used to test whether the scores of any of the five factors varied reliably as a function of respondent gender. Similar but separate analyses were conducted for persons who used a word processor or a VDT as their primary or major support technology.

Only one of the fifteen tests (five factors on three different computer technologies) reached statistical significance. The personal computer's perceived contribution to quality of work life was lower for females than for males ($F(1, 46) = 4.76$, $p<.05$).

Discussion

The data here reveal that there are substantial differences in the perceptions of office technologies and various types of computers. Our main purpose was to examine end user perceptions of different office technologies because acceptance or rejection of a technology could affect productivity and absenteeism in turn (Dierkes & Von Thienen, 1984; Kahn, 1981). Such perceptions should also be considered in the on-going design and implementation of technological office innovation (cf. Bikson & Gutek, 1983; Stolz, 1982).

Office Technology

This study examined five relatively independent perceptions of office technology: effectiveness, quality of work life, control over work, ability to communicate with others and extent of interruption. Three technologies, the computer (personal computer, word processors and terminals), the telephone and the typewriter, were most frequently cited by our respondents as either their primary or secondary technology, with significant differences in user perceptions. Not surprisingly, the telephone was seen as a helpful instrument for communication, but, also, a source of interruption. All three technologies were perceived as contributing to the worker's effectiveness. The computer was described as less important for communication than the telephone or the typewriter, but computers and typewriters were also seen as less interruptive than telephones.

The fact that computers were not perceived as communication aids suggests that our users had few communication devices such as telecommunication systems, but all participating companies in this study possess electronic mail systems which allow access to inter- or intra-company networks. However, we did not ask individuals about their communication devices nor about the type of work performed most frequently with the technology. Time will tell how much more effective the computer will eventually become for communication, and if the computer, as a communication

device, will be perceived as disruptive as the telephone. Electronic mail systems can capture and store any communication, allowing the end user to attend to the message at his/her convenience. Such a system could be compared to a telephone equipped with an answering machine, which also allows the user to attend to messages at his/her convenience.

In this study, the computer was perceived as contributing to a better quality of work life than either the telephone or the typewriter. This finding might be due to the novelty aspects of office computer systems rather than their functions (Bikson & Gutek, 1983). However, the participating organizations had used computers for at least five years before these data were collected, and the survey respondents had already been working with their respective computer technology for an average of four years, and even longer with the typewriter and telephone. As a result, it could reasonably be assumed that the computer was no longer a novelty to them.

Hierarchical level. According to our data, a person's hierarchical level in the organization did not result in differences in perception of the office technologies. An exception is the case of the telephone where managerial respondents indicated a negative effect on the quality of work life. One explanation for the lack of differences in organizational levels could be the self-selection process. People tend to choose positions which meet their needs and allow them to utilize most of their skills (e.g., Brousseau, 1983). While technologies may in fact change work content at various levels, attitudes would not necessarily reflect such objective developments (Gattiker, 1984).

Time spent with technology. The relative similarity of findings for primary and support technologies in this study represents a contradiction to the literature (cf. Ostberg, 1980). One would expect that a worker who uses the telephone, typewriter or computer most of the work day would perceive

the equipment differently from an occasional user. However, all three technologies studied here were considered similarly, regardless of whether they were primary equipment or not. The analyses devoted to the effects of time spent using a particular technology yielded few significant differences. Perhaps the time factor is less important than the technology's actual usage. Gathering important information via telephone and selling magazine subscriptions by telephone are totally opposite tasks. Similarly, programming at a terminal may be preferable to endless hours of data entry (cf. Gutek, 1983; Mankin, Bikson & Gutek, 1982). Yet, some researchers have countered with studies which show that people select occupations and jobs to fit their individual needs in such areas as job complexity and decision-making (Schein, 1978, chap. 8). Therefore, actual time spent with a technology may not change one's perception of it, even though health considerations such as eye strain could come into play (McGlothlin, 1984).

Computer Technology

Type of computer used. A strong connection exists between the type of computer used and how it is perceived. For instance, people working with a personal computer report that technology has less control over them than for individuals using word processors or terminals linked to a main-frame. Since the latter two types of computer technology may be used to control employees, this finding is not too surprising. A central system can record logging on and off times as well as number of keystrokes per minute (Bikson, 1981). Such a system also requires high performance to keep hourly charges for individual departments low, thus increasing the pressure on employees.

The most intriguing discovery indicates that personal computers are perceived to do more for quality of work life than either VDT's or word processors, a discovery that could be interpreted in several ways. The three sub-samples in this study did not differ significantly by demographics. This finding, however, indicates that the work associated

with the technology may be perceived in various ways. A personal computer can be used not only for work purposes, including word processing, networking and spread-sheets, but, also, for personal tax accounting, playing games, etc. (Condry & Keith, 1983). Such broad applications may explain why people feel increased quality of work life from personal computers. It could also be that individual attitudes in this sample were greatly influenced by public opinion and media focus on the "marvelous" things happening in the personal computer revolution (Mankin, Bikson & Gutek, 1982).

Gender. The gender differences in this sample provide a better perspective for previous claims, which reported that computers affect women's work differently than men's (Form & McMillan, 1983; Morgall, 1983). Gender differences may be due to the fact that computerization affects certain occupations more than others, and these seemed to be held primarily by women (Gutek, 1983), but it may also be the case that women are affected differently even when they are in the same occupation (Gutek & Bikson, 1985). The results obtained via this survey confirm that notion.

However, differences between men and women are far less apparent when evaluating the perceptions of computer technology (see also Gutek & Bikson,1985). We found no significant differences based on gender, except for personal computers and quality of work life. Some researchers suggested that women tend to use personal computers for work purposes only, while men also find private applications for them, which could account for the differences found here (Foplin, 1985). Other explanations appear elusive at this time.

Implications for Management and Future Research

This study provides strong evidence that research on office technologies should be placed within a larger context. Any understanding of the effective use of such technology is substantially reduced if employee

perceptions are ignored. Future research should continue to explore this issue. In particular, the possible impact of non-work aspects and roles upon perception of technology should be investigated. A person's perception of a given technology is an important moderating factor on organizational effectiveness and profitability (Gattiker, 1984). The relationship between particular jobs and perception of technology ought to be examined. The scales developed in this study should be tested to see if discrimination or distinctions are possible when looking at different jobs in a variety of fields. One way would be to design several work scenarios, then evaluate those jobs using the items developed here. If there are differences between managers and support personnel, for example, additional research focusing on work groups or workers in various industries and countries might be pursued.

An attempt has been made here to expand the research on office technology by studying user perceptions. Moreover, differences between technologies as well as several types of computers have been shown and tested. Replication is needed before these complex results can be fully accepted. Initially, all constructs need improvement by adding new items so that reliability as well as validity can be increased.

Based on worker's perceptions, which factors distinguish users of various technologies? The results of this study will assist in answering this recurring question. However, other important dimensions may be attitudinal variables such as organizational commitment, career success, and stress (Gattiker, 1984). Future work in this area needs to deal with other perceptual concerns of managers and human resource specialists (e.g., London & Stumpf, 1982; Mobley, 1982; Schein, 1978). Organizations will want to relate worker's beliefs and attitudes with behavioral outcomes and human resource costs to decide on the effectiveness of computerization. Furthermore, companies under various constraints (e.g., governance, ownership, markets) will probably show differences in these areas, which should also be structured.

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Table 1

Items Used to Define Five Factors: Perceptions of Office Technology

Factor	Items	Factor Scores	Variance Explained per Factor[a]	Cronbach's Alpha	Item-Total Correlation
1	This piece of equipment enables me to do my job more effectively.	.84			.56
Work	This piece of equipment makes my work easier.	.84			.60
Effectiveness	This piece of equipment supports me in my work.	.93			.53
	I couldn't do my work without this piece of equipment.	.60			--
	I am much more effective in my work with this equipment than I would be without it.	.86		.41	.66
	Using this equipment makes me more productive.	.68			.58
	In my work, I depend a great deal on this equipment.	.73	26.6	.78	.61
2	This equipment is fun to use.	.78			.59
Quality of	Using this equipment makes my work more interesting.	.81			.68
Work Life	Using this equipment requires a lot of training.	.65			.57
	I enjoy using this piece of equipment.	.48	14.0	.75	.39
3	I feel like this piece of equipment controls my behavior at work.	.68			.60
Control	This piece of equipment makes my work more demanding.	.66			.56
	This piece of equipment paces my work.	.56	11.3	.75	.56
4	This piece of equipment facilitates communication among people in my				
Communication	organization.	.59			.61
	This piece of equipment facilitates communication with people outside my organization.	.59	8.0	.76	.61
5	This piece of equipment frequently causes me to interrupt what I am				
Interruption	doing.	.64			.41
	I can't control my work environment when I use this equipment.	.49	7.0	.58	.41
Items Not Used					
	This piece of equipment frequently breaks down or is overloaded so I cannot use it properly.				
	This piece of equipment makes my work seem impersonal.				
	It is tiring to have to use this equipment continuously for long periods of time.				
	This piece of equipment gives me more freedom on the job.				
	I cannot do another task at the same time I am using this equipment.				

Note. The above factors were obtained using principal components analysis. Orthogonal varimax rotations were performed on the data. Only loadings greater than .30 were statistically significant ($p<.001$), according to the Burt-Banks criterion (Child, 1970).

[a]The five factors together explained 66.9% of the total variance.

Table 2

Cross Tabulation of Female Versus Male Respondents-

Percentage Distribution for Primary and Secondary Technologies

		Primary Technology				
		Phone	Computer	Typewriter	Other	Total
Male	%	66.7	19.1	4.7	9.5	100
	N	14	4	1	2	21
Female	%	26.7	43.3	20.0	10	100
	N	16	26	12	6	60

$\chi^2(3) = 11.45$, $p < .01$

		Secondary Technology				
Male	%	13.6	31.8	4.6	50.0	100
	N	3	7	1	11	22
Female	%	44.0	13.6	8.5	33.9	100
	N	26	8	5	20	59

$\chi^2(3) = 8.50$, $p < .05$

Note. The total Ns vary because of missing data.

Table 3

Means on Five Factors for Primary and Support Office Technologies

	Multivariate Tests[a]			Means (Univariate F-Tests)[b]				
	N	F	df	Work Effectiveness Factor 1	Quality of Work Life Factor 2	Control Factor 3	Communication Factor 4	Interruption Factor 5
Primary Technology	67	10.07***	(10,122)	(.003)	(41.025***)	(1.11)	(25.10***)	(23.51***)
Computer	28			4.58	4.11	2.80	2.82	1.93
Phone	28			4.60	2.64	2.88	4.73	3.68
Typewriter	11			4.62	3.46	2.30	4.23	1.77
Support Technology	49	6.77***	(10,86)	(4.38*)	(7.91**)	(.633)	(15.45***)	(21.16***)
Computer	15			4.51	3.78	2.42	3.33	2.23
Phone	28			3.75	2.79	2.57	4.73	3.74
Typewriter	6			4.74	2.58	2.06	3.92	1.83

[a]Multivariate tests compare the three groups on all five factors simultaneously, using Pillai's V as calculated by SPSS MANOVA.

[b]Univariate F tests are given in parentheses. Scale for means: 1 = Disagree completely; 5 = Agree completely.

*$p < .05$; **$p < .01$; ***$p < .001$